

Development of a New Tracking System based on CMOS Vision Processor Hardware: Phase II – Development and Demonstration of the Prototype Tracking System

Vehicle tracking has been an important area of intelligent transportation systems (ITS), which can be used to monitor vehicle operations and collect traffic data. To improve accuracy and real-time operation of vehicle tracking is the main goal of the proposed project. To achieve this goal, we propose to construct a new tracking system based on a new tracking algorithm and a new way of implementation. The first novelty, the new tracking algorithm, is to incorporate motion estimation techniques in vehicle tracking. The second novelty, a hardware implementation of the tracking algorithm, is to implement the overall tracking system in customized hardware platform as much as possible, which could improve real-time operation of vehicle tracking. In Phase I of the project, we proposed the tracking algorithm and validated it using realistic traffic images through extensive simulation. Also, we had come up with the method for hardware implementation of the tracking algorithm, which was also verified through simulation. Continuing from Phase I, in Phase II our main target is to first physically build the hardware prototype circuit for the tracking system and then to test it in the field. The system prototype is planned to be constructed in the Xilinx Spartan-3A FPGA development board. Field test of the tracking system will mainly focus on intersections, ramps to highways and roundabouts, where data collection is in great need.